

Technology Developed on the Ground Can Save Lives in the Air

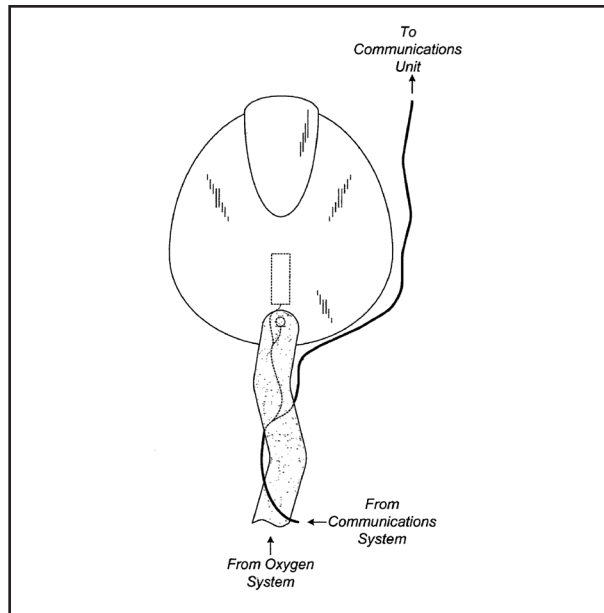
The oxygen mask is a critical tool for high-performance aircraft pilots. In addition to providing voice communications, oxygen masks give pilots their own supply of oxygen to breathe when the aircraft flies at high altitudes, where the air is thinner and contains less oxygen than on the ground.

Malfunctions like a poorly fitting mask, and/or failure of the oxygen hose or distribution system, are often difficult to detect in flight. Without corrective action, the pilot may experience hypoxia, a condition that leads to drowsiness – among other symptoms – and eventually unconsciousness.

In fact, two of the most dangerous factors of hypoxia are its gradual onset and the false feeling of well-being called euphoria. Since hypoxia causes the loss of mental judgment and physical dysfunction, pilots are at great risk of losing control of their plane.

NASA's Johnson Space Center has developed a technology that incorporates an oxygen partial pressure sensor into an aircraft oxygen mask to alert a pilot or crewmember when the partial pressure of oxygen (PPO_2) decreases below a predefined safety level. If the PPO_2 decreases below the level equivalent to a cabin altitude of approximately 10,000 feet, a warning device is activated and will alert the pilot and crew. Since there is a higher correlation between hypoxia and PPO_2 , the PPO_2 is measured instead of the oxygen concentration. This is invaluable, because as long as the PPO_2 is maintained above a certain predefined minimum, hypoxia may be avoided.

Simple to produce, the technology requires minimal modifications – or, in some cases, no changes at all – to existing equipment. Therefore, the technology involves minimal production costs. Other benefits include a precise, quantitative physical measurement of the partial pressure of the oxygen inside the pilot's mask. Also, this exclusive technology is independent of the oxygen system in operation. Unlike other warning devices, malfunctions or breakdowns in the oxygen system itself will not yield false indications of PPO_2 .



In addition, the warning device of this technology differs from other systems currently available, which use auditory or visual warnings that pilots are easily unaware of if hypoxia has already taken effect. Ultimately, this cutting-edge technology helps prevent a potentially hazardous and even fatal situation.

The technology has numerous applications for which oxygen masks are required, or where deprivation of oxygen or inhalation of hazardous chemicals is possible. Commercial applications include commercial and military aviation, military field troops, firefighting, scuba diving, underwater welding, mountain climbing and industrial workers in hazardous-breathing environments.

This unique technology obviously can save lives, and NASA-JSC is seeking a partner to license the technology for commercialization.

Patent 7,040,319 has been issued for this technology. Anyone interested in partnering with NASA to license the technology for commercialization should contact the JSC Technology Transfer Office at jsc-techtran@mail.nasa.gov or 281.483.3809.

About NASA-Johnson Space Center Technology Transfer Office

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